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Remarks:

Claims 1-14, 16-26, and 28-30 remain for consideration in this application. Claims 1, 13-14, 19, and 26 have been amended, and claims 15 and 27 have been canceled. A marked-up version of changes made is attached hereto.

The Examiner rejected claims 5 and 23 under 35 U.S.C. § 112, second paragraph, stating that the term "strain energy" is unclear. The applicants respectfully disagree with this rejection. Strain energy is well-known in the art, and its use in the present claims would be understood by one skilled in this art, particularly in light of the teachings on page 3, lines 27-30 of the specification. The strain energy is a measure of how easy or how difficult it is to cleave a compound into diradicals upon exposure to energy. The larger the strain energy, the easier it is to cleave the compound into stable diradicals. Thus, it is submitted that this rejection should be withdrawn.

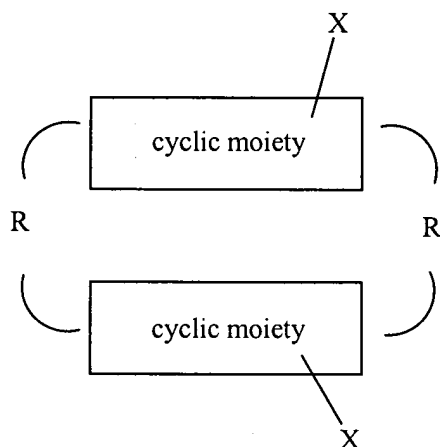
The Examiner also rejected claim 13 under 35 U.S.C. § 112, second paragraph, stating that the use of the term "substantially" rendered claim 13 indefinite. It is believed that this term was sufficiently defined on page 8, lines 13-22. However, to further clarify the matter, the applicants have amended claims 13 and 26 to recite that the thickness will change by less than about 10% in solvents utilized in the photoresist layer. Claims 13 and 26 have also been amended to depend from claims 2 and 20, respectively, so that antecedent basis is provided for the phrase "said photoresist layer." It is believed that this rejection has been overcome.

The Examiner rejected claim 14 under 35 U.S.C. § 112, second paragraph, alleging that it was unclear what was meant by "etching said developed photoresist layer." Specifically, the Examiner stated, "it is unclear if the (patterned) developed photoresist layer itself is further patterned

by etching or if the developed photoresist layer is used as a mask to etch an underlying layer." While the applicants believe that one of ordinary skill in the art would readily understand what is meant by this recitation, claim 14 has been amended in an attempt to satisfy the Examiner in this respect. The claim now recites the step of "subjecting said exposed photoresist layer to an etching process." Thus, it is believed that this rejection has been overcome.

The Examiner rejected claims 17 and 29 under 35 U.S.C. § 112, second paragraph, asserting that the term "percent conformality" is unclear. The applicants must disagree with this rejection. The term "percent conformality" is defined in detail on page 8, line 28 through page 9, line 9 of the specification. The applicants have provided a formula by which the percent conformality is calculated as well as a detailed description of how each of the variables in the formula is obtained. Thus, it is respectfully submitted that this rejection should be withdrawn.

The Examiner rejected claims 1, 3-5, 7, 15-17, 19, 21-23, 25, 27-29 under 35 U.S.C. § 102(b) as being anticipated by Haaland et al. (U.S. Patent No. 5,991,081). For these claims to be anticipated by the Haaland et al. patent, each and every limitation of the claims must be found in the Haaland et al. patent. However, the Haaland et al. patent fails to teach a very important limitation of the claims. Specifically, each of independent claims 1 and 19 recites the step of depositing an antireflective compound having the formula



where X and R are defined in the claims. However, the applicants are unable to locate any teaching in the Haaland et al. patent of such a compound having two cyclic moieties joined by linkage groups R. Thus, Haaland et al. cannot anticipate the claims because it fails to teach at least one of the recited limitations. It is, therefore, requested that this rejection be withdrawn.

The remaining prior art rejections raised by the Examiner against independent claims 1 and 19 (the only independent claims) were obviousness rejections found in paragraphs 8-11 of the action. It is noted that the Examiner raised a rejection against dependent claims 2, 13-14, 20, and 26 in paragraphs 12-13 of the action. However, this rejection is not argued against because these are dependent claims, and it is the applicants belief as discussed above and below that independent claims 1 and 19 are patentable over the art of record. As a result, it will necessarily follow that the dependent claims would be patentable for the same reasons.

In the first of these two rejections, the Examiner rejected claims 1, 3-4, 6-12, 18-19, 21-22, 24-25, and 30 under 35 U.S.C. § 103(a) as being unpatentable over Eissa (U.S. Patent No. 6,150,010) in view of Butterfield et al. (U.S. Patent No. 4,747,647). Claims 1 and 19 have been amended to

recite that the antireflective compound layer absorbs at least about 90% of light at a wavelength of from about 150-500 nm. This is different than the teachings of the Eissa patent which teaches the use of highly fluorinated compounds. Eissa uses highly fluorinated compounds because the fluorine atoms are responsible for lowering the dielectric constant of the compound, and thus of the resulting dielectric layer. However, the use of such highly fluorinated compounds would simultaneously result in compounds and layers having low light absorbance at the recited wavelengths. Exhibit A, an article by Fuqua et al., is attached to support this fact. Referring to the first full paragraph (lines 8-9) on page 1629 of Exhibit A, Fuqua et al. provide data demonstrating that highly fluorinated compound V (see page 1626) has its maximum absorbance peak (6500) at 210 nm. This absorbance is rather low and certainly lower than the at least about 90% absorbance recited in the present claims. For an understanding of the significance of an absorbance value of 6500, if the same data were generated for anthracene, the absorbance value would be about 60,000 rather than 6500 - an increase by almost a factor of 10. The high concentration of fluorine is responsible for this much lower absorbance.

The Butterfield et al. patent does nothing to remedy this shortcoming because it does not teach or suggest how to modify the Eissa teachings to obtain the claimed light absorbance. Furthermore, this combination is based upon nonanalogous art. That is, the present invention is directed towards antireflective coatings which absorb at least about 90% of light at wavelengths of about 150-500 nm. This is very high light absorbance. The Eissa patent is concerned with the art of dielectric layers where the goal is to provide insulating layers with low dielectric constants where light absorbance is of no concern. The Butterfield et al. patent is concerned with antireflection

properties which reduce glare in a contrast enhancement filter. Not only is the Butterfield et al. patent not concerned with preparing coatings which absorb at least about 90% of light at wavelengths of 150-500 nm, Butterfield et al. would *not* want their filters to have such antireflection properties because the filters would not work for their intended purpose. That is, the filters *must* allow most light to pass through or a computer user would not see an image on his or her computer display screen, thus rendering the screen useless. It is, therefore, submitted that one of ordinary skill in the art of antireflective coatings desiring high light absorbance would not look to the teachings of a reference concerned with preparing dielectric layers having low dielectric constants and then look to the teachings of a reference concerned with reducing glare in filters to modify those teachings because this requires the use of nonanalogous art. Furthermore, even if the art were found to be analogous, Butterfield teaches away from obtaining coatings with high light absorbance. It is believed that this rejection has been overcome with the present amendment and argument.

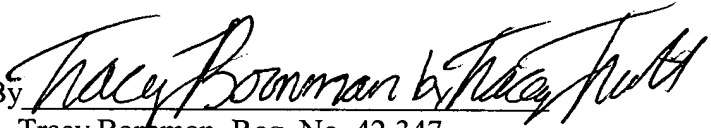
The Examiner rejected claims 1, 3-4, 7-12, 19, 21-22, and 25 under 35 U.S.C. § 103(a) as being unpatentable over Nichols (U.S. Patent No. 5,137,780) in view of NN73101442. The applicants respectfully disagree with this rejection for much the same reasons as those discussed above with respect to the rejection predicated upon the Eissa and Butterfield et al. references. That is, the Nichols et al. patent is concerned with an electrically insulative, moisture-resistant coating. Light absorbance is of no concern or relevance to the teachings of the Nichols et al. patent, and the Nichols et al. coating would not absorb at least about 90% of light at wavelengths of from about 150-500 nm. The Examiner cites NN73101442 for its teaching of the use of parylene as an antireflection coating material, but this reference does nothing to remedy this shortcoming.

Parylene would not have the recited property because parylene is very poor at absorbing light at wavelengths as low as 150-500 nm as claimed and certainly would not absorb at least about 90% of such light. Exhibit B, an article from Specialty Coating Systems (SCS), is provided to support this fact. The Examiner's attention is directed to page 9 of the SCS article. Figure 4 on that page is a graph showing the UV absorption spectra of parylene N and C, with the wavelength being provided in μm or microns rather than nm as claimed. The paragraph to the left of this graph (under the heading "Optical Properties") states that "Parylene exhibits very little absorption in the visible region and is, therefore, colorless." The visible region of light is light having wavelengths of 400-700 nm. This article shows that parylene is poor at absorbing light in the claimed wavelength range of from about 150-500 nm, but instead is only strongly absorptive at very high wavelengths of around 250-280 μm (or 250,000-280,000 nm; 1 μm = 1,000 nm). This is significantly different from the claimed range of at least about 90% absorption at wavelengths of from about 150-500 nm.

Furthermore, the Examiner is again making an obviousness rejection which is predicated upon combining nonanalogous art. One of ordinary skill in the art would not look to the teachings of the Nichols et al. patent which is concerned with the art of insulative coatings (where light absorbance is irrelevant), and then modify these teachings with that of NN73101442 which is concerned with the art of antireflection coatings for enhancing magneto optic effects of transition metal alloys to arrive at the claimed methods or precursor structures where the antireflective layers absorb at least about 90% of light at a wavelength of from about 150-500 nm. Such a leap would require the use of nonanalogous art and would, therefore, not render the pending claims obvious. It is submitted that this rejection has also been overcome.

It is believed that no further issues remain in this patent application. In view of the foregoing amendments, it is believed that the pending claims are in condition for allowance, and a Notice of Allowance is respectfully requested. Any additional fee which is due in connection with this amendment should be applied against our Deposit Account No. 19-0522.

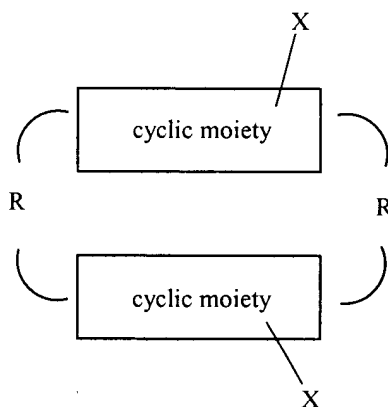
Respectfully submitted,

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ATTORNEYS FOR APPLICANT(S)

1. (Amended) A method of forming a precursor for use in manufacturing integrated circuits comprising the steps of:

providing a quantity of an antireflective compound and a substrate having a surface onto which said compound is to be applied, said antireflective compound having the formula



wherein:

R represents a linkage group; and

each X is individually selected from the group consisting of hydrogen, the halogens, nitro groups, amino groups, acetamido groups, substituted and unsubstituted cyclic and heterocyclic groups, and COR^1 , where R^1 is selected from the group consisting of hydrogen, substituted and unsubstituted phenyl groups,

substituted and unsubstituted alkyl groups, cinnamoyl, naphthoyl, acryloyl, methacryloyl, furoyl, and thiophenecarbonyl groups; and
subjecting said antireflective compound to a chemical vapor deposition process so as to deposit said antireflective compound in a layer on said substrate surface, said antireflective compound layer deposited on said substrate surface absorbing at least about 90% of light at a wavelength of from about 150-500 nm.

13. (Amended) The method of claim ~~1~~ 2, wherein said antireflective compound layer has a thickness after said depositing step, and said thickness will change by less than about 10% is substantially insoluble in solvents utilized in said photoresist layer.

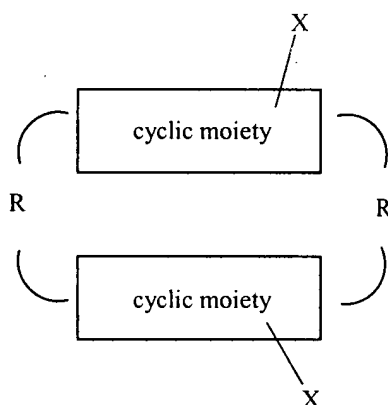
14. (Amended) The method of claim 1, further including the steps of:
exposing at least a portion of said photoresist layer to activating radiation;
developing said exposed photoresist layer; and
~~etching said developed photoresist layer~~ subjecting said exposed photoresist layer to an etching process.

Claim 15 has been canceled.

19. (Amended) A precursor structure formed during the course of the integrated circuit manufacturing process, said structure comprising:

a substrate having a surface; and

a layer comprising an antireflective compound on said surface, said antireflective compound layer being formed on said surface by a chemical vapor deposition process and said antireflective compound comprising a polymer being formed from monomers having the formula



wherein:

R represents a linkage group; and

each X is individually selected from the group consisting of the hydrogen, the halogens, nitro groups, amino groups, acetamido groups, substituted and unsubstituted cyclic and heterocyclic groups, and COR¹, where R¹ is selected from the group consisting of hydrogen, substituted and unsubstituted phenyl groups, substituted and unsubstituted alkyl groups, cinnamoyl, naphthoyl,

acryloyl, methacryloyl, furoyl, and thiophenecarbonyl groups, wherein the antireflective compound layer absorbs at least about 90% of light at a wavelength of from about 150-500 nm.

26. (Amended) The structure of claim ~~19~~ 20, wherein said antireflective compound layer has a thickness after said depositing step, and said thickness will change by less than about 10% is substantially insoluble in solvents utilized in said photoresist layer.

Claim 27 has been canceled.